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LAKE WALLENPAUPACK, PIKE AND WAYNE COUNTIES, PENNSYLVANIA. EPA REGION III

Pacific Northwest Environmental Research Laboratory

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June 1975

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U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL EUTROPHICATION SURVEY

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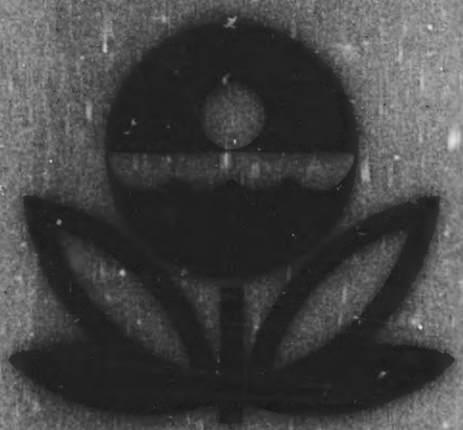

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REPORT
ON
LAKE WALLENPAUPACK
PIKE AND WAYNE COUNTIES
PENNSYLVANIA
EPA REGION III
WORKING PAPER NO. 428

WITH THE COOPERATION OF THE
PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES
AND THE
PENNSYLVANIA NATIONAL GUARD
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16. ABSTRACT

Annual total phosphorus and total nitrogen loadings to the lake were estimated and subdivided according to either point or non-point source origin. An assessment of the lake's trophic condition and limiting nutrient is also provided. All data collected by the U.S.E.P.A. National Eutrophication Survey during the one year study of the lake and its tributaries are included in the report.

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FOREWORD

The National Eutrophication Survey was initiated in 1972 in response to an Administration commitment to investigate the nationwide threat of accelerated eutrophication to fresh water lakes and reservoirs.

OBJECTIVES

The Survey was designed to develop, in conjunction with state environmental agencies, information on nutrient sources, concentrations, and impact on selected freshwater lakes as a basis for formulating comprehensive and coordinated national, regional, and state management practices relating to point-source discharge reduction and non-point source pollution abatement in lake watersheds.

ANALYTIC APPROACH

The mathematical and statistical procedures selected for the Survey's eutrophication analysis are based on related concepts that:

a. A generalized representation or model relating sources, concentrations, and impacts can be constructed.

b. By applying measurements of relevant parameters associated with lake degradation, the generalized model can be transformed into an operational representation of a lake, its drainage basin, and related nutrients.

c. With such a transformation, an assessment of the potential for eutrophication control can be made.

LAKE ANALYSIS

In this report, the first stage of evaluation of lake and watershed data collected from the study lake and its drainage basin is documented. The report is formatted to provide state environmental agencies with specific information for basin planning [§303(e)], water quality criteria/standards review [§303(c)], clean lakes [§314(a,b)], and water quality monitoring [§106 and §305(b)] activities mandated by the Federal Water Pollution Control Act Amendments of 1972.

Beyond the single lake analysis, broader based correlations between nutrient concentrations (and loading) and trophic condition are being made to advance the rationale and data base for refinement of nutrient water quality criteria for the Nation's fresh water lakes. Likewise, multivariate evaluations for the relationships between land use, nutrient export, and trophic condition, by lake class or use, are being developed to assist in the formulation of planning guidelines and policies by EPA and to augment plans implementation by the states.

ACKNOWLEDGMENT

The staff of the National Eutrophication Survey (Office of Research & Development, U. S. Environmental Protection Agency) expresses sincere appreciation to the Pennsylvania Department of Environmental Resources for professional involvement and to the Pennsylvania National Guard for conducting the tributary sampling phase of the Survey.

Walter A. Lyon, Director of the Bureau of Water Quality Management, Richard M. Boardman, Chief of the Division of Water Quality, and James T. Ulanoski, Aquatic Biologist of the Division of Water Quality, provided invaluable lake documentation and counsel during the Survey, reviewed the preliminary reports, and provided critiques most useful in the preparation of this Working Paper series.

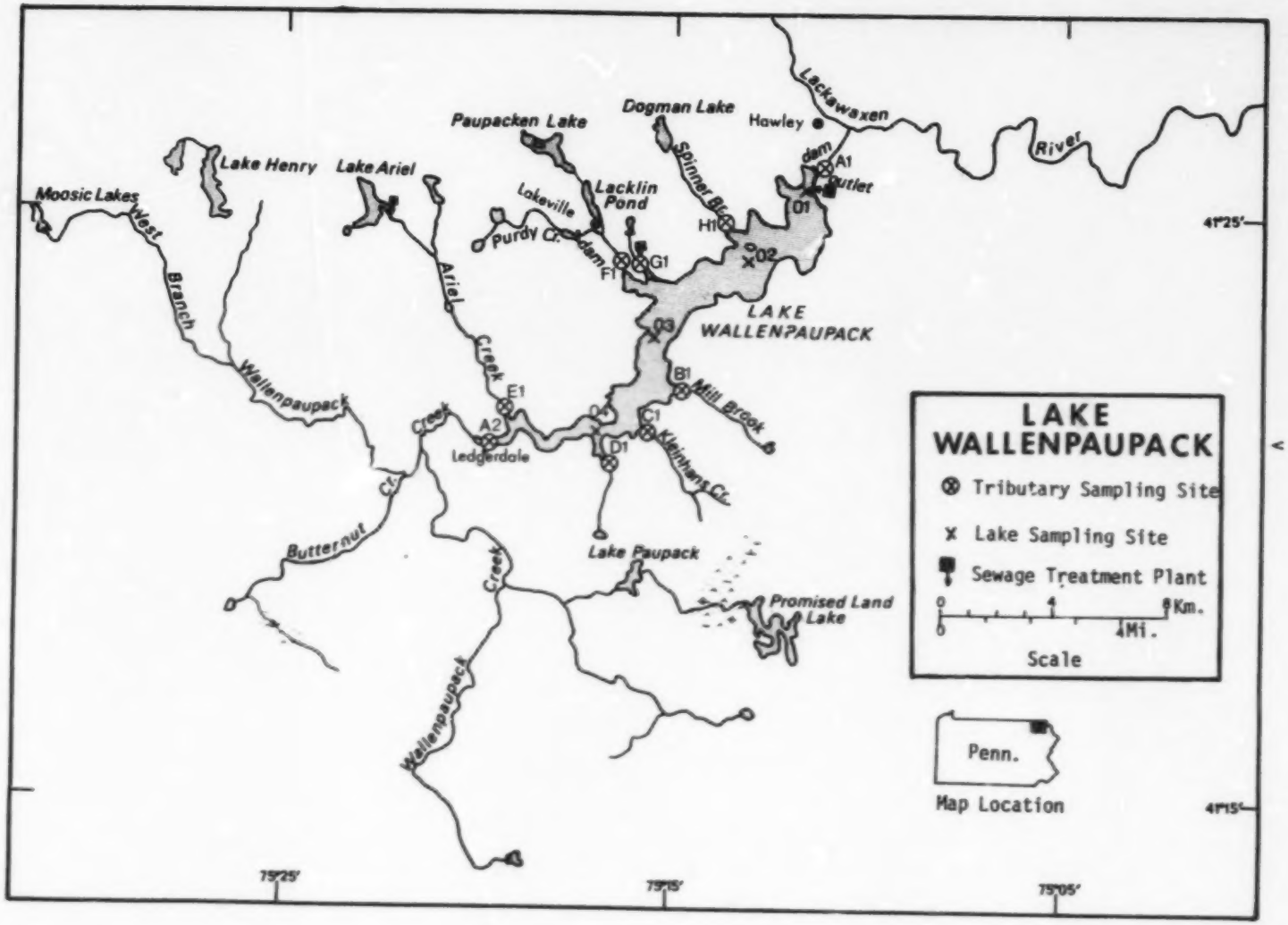
Major General Harry J. Mier, Jr., the Adjutant General of Pennsylvania, and Project Officer Major Ronald E. Wickard, who directed the volunteer efforts of the Pennsylvania National Guardsmen, are also gratefully acknowledged for their assistance to the Survey.

NATIONAL EUTROPHICATION SURVEY

STUDY LAKES

STATE OF PENNSYLVANIA

LAKE NAME	COUNTY
Allegheny Reservoir	McKean, Warren, PA; Cattaraugus, NY
Beaver Run Reservoir	Westmoreland
Beltzville	Carbon
Blanchard Reservoir	Centre
Canadohta	Crawford
Conneaut	Crawford
Conewago (Pinchot)	York
Greenlane	Montgomery
Harveys	Luzerne
Indian	Somerset
Naomi	Monroe
Ontelaunee	Berks
Pocono	Monroe
Pymatuning Reservoir	Crawford, PA; Ashtabula, OH
Shenango River Reservoir	Mercer
Stillwater	Monroe
Wallenpaupack	Pike, Wayne


Lackawaxen River
Hawley
Dogman Lake
Paupacken Lake
Lake Henry
Lake Ariel
Moosic Lakes
West Branch Wallenpaupack Creek
Ariel Creek
Lakeville
Purdy Cr.
Lacklin Pond
Spinner Brook
dam
A1
Outlet
O1
H1
O2
F1
G1
LAKE WALLENPAUPACK
O3
B1
Mill Brook
E1
A2
Ledgerdale
C1
Kleinhans Cr.
D1
Butternut Cr.
Lake Paupack
Wallenpaupack Creek
Promised Land Lake
41°25'
41°15'
75°25'
75°15'
75°05'
LAKE WALLENPAUPACK
Tributary Sampling Site
Lake Sampling Site
Sewage Treatment Plant
0 1 2 Km.
0 1 2 Mi.
Scale
Penn.
Map Location

LAKE WALLENPAUPACK*

STORET NO. 4229

I. CONCLUSIONS

A. Trophic Condition:

Survey data indicate that Lake Wallenpaupack is mesotrophic, although the blue-green algal blooms that have only recently occurred (see below) indicate this lake is becoming eutrophic. It ranked seventh in overall trophic quality when the 17 Pennsylvania lakes sampled in 1973 were compared using a combination of six parameters**. Four of the lakes had less and two had the same median total phosphorus, five had less and three had the same median dissolved phosphorus, eight had less median inorganic nitrogen, eight had less mean chlorophyll a, and three had greater mean Secchi disc transparency. Marked depression of dissolved oxygen with depth occured at all four sampling stations in July and October, 1973.

Survey limnologists noted submerged aquatic vegetation along the east shore south of sampling station 1 but did not observe algal concentrations during sampling visits in April, July, and October of 1973 (the numbers of algae in the samples collected at those times confirm the observations). However, in early September, 1973, personnel of the Academy of Natural Sciences

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* Table of metric conversions--Appendix A.
** See Appendix B.

of Philadelphia investigated a blue-green algal bloom at the lake (Anonymous, 1973). They found the dominant alga was Anabaena circinalis, and total algal counts ranged from about 3,000 to 20,000 cells per milliliter at the 16 stations sampled (mean count per station = 8,750 cells per milliliter). Also, while algal blooms were absent in 1974, another blue-green algal bloom occurred in the summer of 1975 (Ulanoski, 1975).

B. Rate-Limiting Nutrient:

The algal assay results indicate the primary productivity of Lake Wallenpaupack was limited by phosphorus at the time the sample was collected. The lake data indicate phosphorus limitation in July as well but marginal nitrogen limitation in October.

C. Nutrient Controllability:

1. Point sources--The phosphorus contribution of known point sources accounted for 10.4% of the total load reaching Lake Wallenpaupack during the sampling year. The major portion of this load came from the wastewater treatment plant at Cove Haven (6.6% of the total).

The present loading rate of 0.36 $g/m^2/yr$ is well below the rate proposed by Vollenweider (Vollenweider and Dillon, 1974) as a eutrophic rate (see page 15). However, the blue-green

algal blooms noted by other investigators (Anonymous, op. cit.) is indicative of cultural enrichment. Therefore, point-source reduction of phosphorus should be provided to slow the eutrophication of this lake.

2. Non-point sources--Non-point sources accounted for 89.5% of the mean annual total phosphorus load. Wallenpaupack Creek contributed 47.1% of the total, Ariel Creek contributed 5.5%, Purdy Creek contributed 4.0%, and the unnamed creek (G-1) contributed 11.0%. The remaining four tributaries collectively contributed 5.0% of the load. Ungaged tributaries were estimated to have contributed 11.6% of the total.

The nutrient export rate of Unnamed Creek G-1 (209 kg P/km^2/yr) is over 12 times greater than the mean of the export rates of the other tributaries of Lake Wallenpaupack (see page 15). This very high rate and the low export N/P ratio strongly indicate either unsampled point sources impact this creek, or the phosphorus loads from Cove Haven Resort were underestimated.

II. LAKE AND DRAINAGE BASIN CHARACTERISTICS

A. Lake Morphometry†:

1. Surface area: 23.31 kilometers^2.
2. Mean depth: 8.5 meters.
3. Maximum depth: 13.4 meters.
4. Volume: 198.135 x 10^6 m^3.
5. Mean hydraulic retention time: 229 days.

B. Tributary and Outlet:
(See Appendix C for flow data)

1. Tributaries -

Name	Drainage area (km^2)*	Mean flow (m^3/sec)*
Wallenpaupack Creek	391.1	4.8
Mill Brook	12.4	0.3
Kleinhans Creek	10.6	0.2
Unnamed Creek (D-1)	3.8	<0.1
Ariel Creek	40.4	0.5
Purdy Creek	21.2	0.4
Unnamed Creek (G-1)	4.4	<0.1
Spinner Brook	7.1	0.1
Minor tributaries & immediate drainage -	76.2	3.6
Totals	567.2	10.0

2. Outlet -

Wallenpaupack Creek	590.5**	10.0

C. Precipitation***:

1. Year of sampling: 89.1 centimeters.
2. Mean annual: 97.8 centimeters.

† Ulanoski, 1975.
* For limits of accuracy, see Working Paper No. 175, "...Survey Methods, 1973-1976".
** Includes area of lake.
*** See Working Paper No. 175.

III. LAKE WATER QUALITY SUMMARY

Lake Wallenpaupack was sampled three times during the open-water season of 1973 by means of a pontoon-equipped Huey helicopter. Each time, samples for physical and chemical parameters were collected from four stations on the lake and from a number of depths at each station (see map, page v). During each visit, a single depth-integrated (4.6 m to surface) sample was composited from the stations for phytoplankton identification and enumeration; and during the first visit, a single 18.9-liter depth-integrated sample was composited for algal assays. Also each time, a depth-integrated sample was collected from each of the stations for chlorophyll a analysis. The maximum depths sampled were 14.9 meters at station 1, 11.6 meters at station 2, 11.3 meters at station 3, and 9.1 meters at station 4.

The lake sampling results are presented in full in Appendix D and are summarized in the following table.

A. SUMMARY OF PHYSICAL AND CHEMICAL CHARACTERISTICS FOR LAKE WALLENPAUPACK
STORET CODE 4229

PARAMETER	1ST SAMPLING (4/12/73) 4 SITES RANGE	MEAN	MEDIAN	2ND SAMPLING (7/23/73) 4 SITES RANGE	MEAN	MEDIAN	3RD SAMPLING (10/ 3/73) 4 SITES RANGE	MEAN	MEDIAN
TEMP (C)	6.7 - 7.7	7.1	6.9	11.1 - 25.2	20.4	23.2	10.8 - 18.3	16.8	17.6
DISS OXY (MG/L)	11.1 - 12.0	11.6	11.9	0.9 - 8.9	4.9	3.8	0.0 - 9.4	5.9	7.4
CNDCTVY (MCROMO)	65. - 70.	66.	65.	42. - 54.	49.	48.	48. - 83.	55.	50.
PH (STAND UNITS)	8.2 - 8.9	8.7	8.8	5.9 - 7.0	6.4	6.5	6.3 - 7.0	6.6	6.5
TOT ALK (MG/L)	10. - 16.	13.	14.	13. - 26.	19.	18.	14. - 29.	20.	21.
TOT P (MG/L)	0.010 - 0.017	0.013	0.013	0.010 - 0.053	0.018	0.014	0.016 - 0.330	0.052	0.023
ORTHO P (MG/L)	0.005 - 0.016	0.007	0.006	0.004 - 0.019	0.008	0.007	0.002 - 0.174	0.024	0.005
NO2+NO3 (MG/L)	0.200 - 0.260	0.234	0.250	0.030 - 0.280	0.095	0.070	0.020 - 0.040	0.026	0.020
AMMONIA (MG/L)	0.020 - 0.050	0.031	0.030	0.030 - 0.310	0.124	0.070	0.040 - 1.370	0.284	0.080
KJEL N (MG/L)	0.200 - 0.400	0.267	0.300	0.200 - 0.800	0.400	0.400	0.500 - 2.800	0.906	0.800
INORG N (MG/L)	0.230 - 0.300	0.265	0.270	0.060 - 0.430	0.219	0.130	0.060 - 1.410	0.310	0.115
TOTAL N (MG/L)	0.480 - 0.650	0.500	0.500	0.280 - 0.900	0.495	0.460	0.520 - 2.040	0.932	0.825
CHLRPYL A (UG/L)	4.6 - 9.1	7.2	7.5	6.0 - 13.9	8.8	7.7	10.1 - 14.9	12.8	13.1
SECCHI (METERS)	1.4 - 1.5	1.5	1.5	3.4 - 4.9	4.3	4.6	1.7 - 3.1	2.2	2.0

B. Biological characteristics:

1. Phytoplankton -

Sampling Date	Dominant Genera	Algal units per ml
04/12/73	1. Asterionella	2,447
	2. Flagellates	256
	3. Dinobryon	181
	4. Cryptomonas	115
	5. Meridion	33
	Other genera	58
	Total	3,090
07/23/73	1. Chrysophycean flagellates	1,250
	2. Aphanizomenon	245
	3. Tabellaria	217
	4. Anabaena	82
	5. Cryptomonas	54
	Other genera	135
	Total	1,983
10/03/73	1. Anabaena	174
	2. Flagellates	144
	3. Fragilaria	123
	4. Aphanizomenon	72
	5. Asterionella	72
	Other genera	154
	Total	739

2. Chlorophyll *a* -

Sampling Date	Station Number	Chlorophyll *a* (µg/l)
04/12/73	01	8.5
	02	9.1
	03	6.5
	04	4.6
07/23/73	01	6.4
	02	6.0
	03	9.1
	04	13.9
10/03/73	01	11.6
	02	10.1
	03	14.9
	04	14.7

C. Limiting Nutrient Study:

1. Autoclaved, filtered, and nutrient spiked -

Spike (mg/l)	Ortho P Conc. (mg/l)	Inorganic N Conc. (mg/l)	Maximum yield (mg/l-dry wt.)
Control	0.012	0.296	0.1
0.050 P	0.062	0.296	6.8
0.050 P + 1.0 N	0.062	1.296	18.5
1.0 N	0.012	1.296	0.1

2. Discussion -

The control yield of the assay alga, *Selenastrum capricornutum*, indicates that the potential primary productivity of Lake Wallenpaupack was relatively low at the time the sample was taken. Also, a significant increase in yield with the addition of phosphorus alone indicates that the lake was limited by phosphrous at that time. Note that the

addition of only nitrogen resulted in a yield no greater than the control.

The lake data indicate phosphorus limitation in July as well (the mean N/P ratio was 27/1) but marginal nitrogen limitation in October (the mean N/P ratio was 13/1).

IV. NUTRIENT LOADINGS
(See Appendix E for data)

For the determination of nutrient loadings, the Pennsylvania National Guard collected monthly near-surface grab samples from each of the tributary sites indicated on the map (page v), except for the high runoff month of March when two samples were collected. Sampling was begun in May, 1973, and was completed in April, 1974.

Through an interagency agreement, stream flow estimates for the year of sampling and a "normalized" or average year were provided by the Pennsylvania District Office of the U.S. Geological Survey for the tributary sites nearest the lake.

In this report, nutrient loads for sampled tributaries were determined by using a modification of a U.S. Geological Survey computer program for calculating stream loadings*. Nutrient loads shown are those measured minus point-source loads, if any.

Nutrient loads for unsampled "minor tributaries and immediate drainage" ("ZZ" of U.S.G.S.) were estimated using the means of the nutrient exports, in $kg/km^2/year$, at stations B-1, C-1, and D-1 and multiplying the means by the ZZ area in km^2.

The operators of the Hideout, Pocono Plateau Christian Association, Cove Haven, and Wallenpaupack Area High School wastewater treatment plants provided monthly effluent samples and corresponding flow data.

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* See Working Paper No. 175.

Estimates of nutrient contributions by wild ducks were based on the following numbers of waterfowl using Lake Wallenpaupack as provided by the Pennsylvania Department of Environmental Resources (Ulanoski, 1975):

Summer resident ducks	100
Migratory ducks	1,500

In calculating the nutrient loads, the following assumptions were made:

1. Each wild duck contributed 0.45 kg total nitrogen and 0.20 kg total phosphorus per year (Paloumpis and Starrett, 1960).

2. Summer resident ducks are at the lake for six months of the year.

3. Migratory ducks spend a total of one month per year at the lake; i.e., 15 days during Spring migration and 15 days during Fall migration.

A. Waste Sources:

1. Known muncipal* -

Name	Pop. Served	Treatment	Mean Flow (m^3/d)	Receiving Water
The Hideout	494**	act. sludge	187.0	Ariel Creek
Cove Haven Honeymoon Resort	300	act. sludge	136.0	Unnamed Cr. (G-1)/ Lk. Wallenpaupack
Wallenpaupack Area High Sch.	1,000	act. sludge, trickling filter	20.9	Lk. Wallenpaupack
Pocono Plateau Christian Assoc.	16**	act. sludge	6.0	Taylor Creek/ Wallenpaupack Cr.

2. Known industrial -

Name	Product	Treatment	Mean Flow (m^3/d)	Receiving Water
Dairymen's Co-op League	dairy products	?	?	Wallenpaupack Creek

* Treatment plant questionnaires.
** Population estimate based on flow of 0.3785 m^3/capita/day.

B. Annual Total Phosphorus Loading - Average Year:

1. Inputs -

Source	kg P/ yr	% of total
a. Tributaries (non-point load) -		
Wallenpaupack Creek	3,920	47.1
Mill Brook	185	2.2
Kleinhans Creek	110	1.3
Unnamed Creek (D-1)	50	0.6
Ariel Creek	460	5.5
Purdy Creek	335	4.0
Unnamed Creek (G-1)	920	11.0
Spinner Brook	75	0.9
b. Minor tributaries & immediate drainage (non-point load) -	965	11.6
c. Known municipal STP's -		
Pocono Plateau Christian Assoc.	<5	<0.1
The Hideout	40	0.5
Cove Haven	550	6.6
Wallenpaupack High Sch.	30	0.4
d. Septic tanks* -	245	2.9
e. Known industrial - Unknown	?	-
f. Wild ducks -	35	0.4
g. Direct precipitation** -	410	4.9
Total	8,330	100.0

2. Outputs -

Lake outlet - Wallenpaupack Creek 6,940

3. Net annual P accumulation - 1,390 kg.

* Estimate based on six campsites, three parks, and 808 lakeshore dwellings; see Working Paper No. 175.
** See Working Paper No. 175.

C. Annual Total Nitrogen Loading - Average Year:

1. Inputs -

Source	kg N/yr	% of total
a. Tributaries (non-point load) -		
Wallenpaupack Creek	171,470	57.1
Mill Brook	6,695	2.2
Kleinhans Creek	6,025	2.0
Unnnamed Creek (D-1)	2,180	0.7
Ariel Creek	18,010	6.0
Purdy Creek	11,170	3.7
Unnamed Creek (G-1)	3,105	1.0
Spinner Brook	3,245	1.1
b. Minor tributaries & immediate drainage (non-point load) -	42,725	14.2
c. Known municipal STP's -		
Pocono Plateau Christian Assoc.	5	<0.1
The Hideout	325	0.1
Cove Haven	805	0.3
Wallenpaupack High Sch.	125	<0.1
d. Septic tanks* -	9,140	3.0
e. Known industrial - Unknown	?	-
f. Wild ducks -	80	<0.1
g. Direct precipitation** -	25,165	8.4
Total	300,270	100.0

2. Outputs -

Lake outlet - Wallenpaupack Creek 239,080

3. Net annual N accumulation - 61,190 kg.

* Estimate based on six campsites, three parks, and 808 lakeshore dwellings; see Working Paper No. 175.
** See Working Paper No. 175.

D. Mean Annual Non-point Nutrient Export by Subdrainage Area:

Tributary	kg P/km²/yr	kg N/km²/yr	N/P Ratio
Wallenpaupack Creek	10	438	44/1
Mill Brook	15	540	36/1
Kleinhans Creek	10	568	57/1
Unnamed Creek (D-1)	13	574	44/1
Ariel Creek	11	446	41/1
Purdy Creek	16	527	33/1
Unnamed Creek (G-1)	209	706	3/1
Spinner Brook	11	457	42/1

E. Yearly Loading Rates:

In the following table, the existing phosphorus loading rates are compared to those proposed by Vollenweider (Vollenweider and Dillon, 1974). Essentially, his "dangerous" rate is the rate at which the receiving water would become eutrophic or remain eutrophic; his "permissible" rate is that which would result in the receiving water remaining oligotrophic or becoming oligotrophic if morphometry permitted. A mesotrophic rate would be considered one between "dangerous" and "permissible".

Note that Vollenweider's model may not be applicable to water bodies with short hydraulic retention times.

	Total Phosphorus		Total Nitrogen	
	Total	Accumulated	Total	Accumulated
grams/m²/yr	0.36	0.06	12.9	2.6

Vollenweider loading rates for phosphorus (g/m²/yr) based on mean depth and mean hydraulic retention time of Lake Wallenpaupack:

"Dangerous" (eutrophic rate)	0.72
"Permissible" (oligotrophic rate)	0.36

V. LITERATURE REVIEWED

Anonymous, 1973. Chemical and biological studies, Lake Wallenpaupack, September 9, 1973 (for Lake Wallenpaupack Watershed Ecological Association). Dept. of Limnology, Acad. Nat. Sci. of Philadelphia.

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VII. APPENDICES

APPENDIX A

CONVERSION FACTORS

CONVERSION FACTORS

Hectares x 2.471 = acres

Kilometers x 0.6214 = miles

Meters x 3.281 = feet

Cubic meters x 8.107×10^{-4} = acre/feet

Square kilometers x 0.3861 = square miles

Cubic meters/sec x 35.315 = cubic feet/sec

Centimeters x 0.3937 = inches

Kilograms x 2.205 = pounds

Kilograms/square kilometer x 5.711 = lbs/square mile

APPENDIX B

LAKE RANKINGS

LAKES RANKED BY INDEX NOS.

RANK	LAKE CODE	LAKE NAME	INDEX NO
1	4224	LAKE NAOMI	445
2	4220	BELTZVILLE DAM	423
3	4222	HARVEY'S LAKE	413
4	4228	STILLWATER LAKE	401
5	4227	POCONO LAKE	389
6	4223	INDIAN LAKE	388
7	3641	ALLEGHENY RESERVOIR	385
8	4229	LAKE WALLENPAUPACK	371
9	4221	CANADOHTA LAKE	369
10	4219	BEAVER RUN RESERVOIR	360
11	4204	CONNEAUT LAKE	307
12	4226	PINCHOT LAKE	256
13	4213	PYMATUNING RESERVOIR	206
14	4216	SHENANGO RIVER RESERVOIR	157
15	4225	ONTELAUNEE DAM	101
16	4201	BLANCHARD RESERVOIR	85
17	4207	GREENLANE DAM	53

PERCENT OF LAKES WITH HIGHER VALUES (NUMBER OF LAKES WITH HIGHER VALUES)

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500-MEAN SEC	MEAN CHLORA	15-MIN DO	MEDIAN DISS P	INDEX NO
3641	ALLEGHENY RESERVOIR	56 (9)	38 (6)	63 (10)	100 (16)	69 (11)	59 (8)	385
4201	BLANCHARD RESERVOIR	13 (2)	13 (2)	25 (4)	31 (5)	3 (0)	0 (0)	85
4204	CONNEAUT LAKE	44 (7)	63 (10)	69 (11)	56 (9)	34 (5)	41 (6)	307
4207	GREENLANE DAM	6 (1)	6 (1)	19 (3)	13 (2)	3 (0)	6 (1)	53
4213	PYMATUNING RESERVOIR	0 (0)	72 (11)	6 (1)	0 (0)	100 (16)	28 (4)	206
4216	SHENANGO RIVER RESERVOIR	19 (3)	44 (7)	13 (2)	6 (1)	47 (7)	28 (4)	157
4219	BEAVER RUN RESERVOIR	94 (15)	19 (3)	88 (14)	81 (13)	19 (2)	59 (8)	360
4220	BELTZVILLE DAM	88 (14)	25 (4)	94 (15)	94 (15)	34 (5)	88 (13)	423
4221	CANADOHTA LAKE	50 (8)	97 (15)	56 (9)	19 (3)	59 (9)	88 (13)	369
4222	HARVEY'S LAKE	63 (10)	81 (13)	100 (16)	63 (10)	47 (7)	59 (8)	413
4223	INDIAN LAKE	100 (16)	31 (5)	75 (12)	75 (12)	19 (2)	88 (13)	388
4224	LAKE NAOMI	81 (13)	88 (14)	44 (7)	69 (11)	88 (14)	75 (12)	445
4225	ONTELAUNEE DAM	25 (4)	0 (0)	0 (0)	44 (7)	19 (2)	13 (2)	101
4226	PINCHOT LAKE	31 (5)	56 (9)	31 (5)	38 (6)	81 (13)	19 (3)	256
4227	POCONO LAKE	38 (6)	97 (15)	50 (8)	88 (14)	75 (12)	41 (6)	389
4228	STILLWATER LAKE	72 (11)	72 (11)	38 (6)	25 (4)	94 (15)	100 (16)	401
4229	LAKE WALLENPAUPACK	72 (11)	50 (8)	81 (13)	50 (8)	59 (9)	59 (8)	371

LAKE DATA TO BE USED IN RANKINGS

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500-MEAN SEC	MEAN CHLORA	15-MIN DO	MEDIAN DISS P
3641	ALLEGHENY RESERVOIR	0.016	0.380	414.250	3.700	13.800	0.006
4201	BLANCHARD RESERVOIR	0.064	1.300	453.143	15.187	14.900	0.046
4204	CONNEAUT LAKE	0.023	0.185	402.000	7.567	14.600	0.007
4207	GREENLANE DAM	0.066	1.475	460.222	24.011	14.900	0.020
4213	PYMATUNING RESERVOIR	0.070	0.180	467.750	56.333	7.700	0.008
4216	SHENANGO RIVER RESERVOIR	0.058	0.340	463.555	26.800	14.500	0.008
4219	BEAVER RUN RESERVOIR	0.009	0.835	384.833	5.183	14.800	0.006
4220	BELTZVILLE DAM	0.010	0.815	362.444	4.856	14.600	0.005
4221	CANADOHTA LAKE	0.020	0.130	436.000	19.167	14.100	0.005
4222	HARVEY'S LAKE	0.015	0.160	338.000	5.967	14.500	0.006
4223	INDIAN LAKE	0.008	0.520	400.222	5.211	14.800	0.005
4224	LAKE NAOMI	0.014	0.135	443.333	5.533	8.000	0.005
4225	ONTELAUNEE DAM	0.040	2.150	470.667	11.783	14.800	0.011
4226	PINCHOT LAKE	0.027	0.245	453.000	13.950	11.500	0.008
4227	POCONO LAKE	0.024	0.130	438.800	4.980	13.200	0.007
4228	STILLWATER LAKE	0.015	0.180	449.000	18.233	7.900	0.004
4229	LAKE WALLENPAUPACK	0.015	0.250	394.583	9.617	14.100	0.006

APPENDIX C

TRIBUTARY FLOW DATA

TRIBUTARY FLOW INFORMATION FOR PENNSYLVANIA 1/27/75

LAKE CODE 4229 LAKE WALLENPAUPACK

TOTAL DRAINAGE AREA OF LAKE(SQ KM) 590.5

TRIBUTARY	SUB-DRAINAGE AREA(SQ KM)	NORMALIZED FLOWS(CMS) JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN
4229A1	590.5	11.78	11.04	13.31	14.78	10.34	9.12	8.13	8.41	8.07	7.93	7.96	9.37	10.01
4229A2	391.1	4.59	5.32	9.34	9.91	6.23	3.40	2.61	2.38	1.98	2.55	4.39	5.38	4.83
4229B1	12.4	0.27	0.31	0.59	0.62	0.37	0.19	0.14	0.13	0.11	0.14	0.25	0.31	0.29
4229C1	10.6	0.17	0.19	0.31	0.34	0.22	0.13	0.10	0.09	0.08	0.10	0.16	0.19	0.17
4229D1	3.8	0.06	0.07	0.15	0.16	0.08	0.04	0.02	0.02	0.02	0.02	0.05	0.07	0.06
4229E1	40.4	0.48	0.57	1.13	1.19	0.68	0.34	0.23	0.21	0.17	0.23	0.45	0.57	0.52
4229F1	21.2	0.28	0.37	0.99	1.08	0.48	0.17	0.11	0.09	0.07	0.10	0.27	0.37	0.36
4229G1	4.4	0.03	0.04	0.17	0.20	0.06	0.02	0.01	0.01	0.00	0.01	0.03	0.04	0.05
4229H1	7.1	0.07	0.09	0.31	0.37	0.12	0.03	0.02	0.02	0.01	0.02	0.06	0.09	0.10
4229ZZ	98.4	5.83	4.08	0.31	0.91	2.10	4.81	4.90	5.47	5.64	4.76	2.29	2.35	3.62

SUMMARY

TOTAL DRAINAGE AREA OF LAKE = 590.5
SUM OF SUB-DRAINAGE AREAS = 589.4
TOTAL FLOW IN = 120.23
TOTAL FLOW OUT = 120.23

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
4229A1	5	73	14.47	19	8.21				
	6	73	22.71						
	7	73	23.28						
	8	73	15.43						
	9	73	4.08						
	10	73	6.60						
	11	73	0.05						
	12	73	15.12						
	1	74	27.44	19	22.34				
	2	74	24.92	9	26.96				
	3	74	21.01	23	23.90				
4229A2	5	73	9.63	19	16.99				
	6	73	10.76	17	3.68				
	7	73	5.95	22	0.03				
	8	73	3.40	25	1.90				
	9	73	1.93	22	1.87				
	10	73	1.78	20	1.42				
	11	73	2.83	17	2.55				
	12	73	12.18	15	7.65				
	1	74	8.78	19	7.93				
	2	74	5.95	9	4.81				
	3	74	7.65	23	17.56				
	4	74	10.76	20	6.51				

24

TRIBUTARY FLOW INFORMATION FOR PENNSYLVANIA 1/27/75

LAKE CODE 4229 LAKE WALLENPAUPACK

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
4229B1	5	73	0.59	19	1.16				
	6	73	0.68	17	0.21				
	7	73	0.37	22	0.15				
	8	73	0.20	25	0.10				
	9	73	0.10	22	0.10				
	10	73	0.09	20	0.07				
	11	73	0.16	17	0.14				
	12	73	0.82	15	0.45				
	1	74	0.57	19	0.51				
	2	74	0.37	9	0.28				
	3	74	0.48	23	1.19				
	4	74	0.71	20	0.40				
4229C1	5	73	0.31	19	0.57				
	6	73	0.37	17	0.14				
	7	73	0.21	22	0.10				
	8	73	0.13	25	0.07				
	9	73	0.07	22	0.07				
	10	73	0.07	20	0.05				
	11	73	0.11	17	0.10				
	12	73	0.42	15	0.27				
	1	74	0.31	19	0.28				
	2	74	0.21	9	0.18				
	3	74	0.27	23	0.59				
	4	74	0.37	20	0.24				
4229D1	5	73	0.15	19	0.34				
	6	73	0.18	17	0.04				
	7	73	0.08	22	0.03				
	8	73	0.04	25	0.02				
	9	73	0.02	22	0.02				
	10	73	0.01	20	0.01				
	11	73	0.03	17	0.02				
	12	73	0.22	15	0.11				
	1	74	0.14	19	0.12				
	2	74	0.08	9	0.06				
	3	74	0.11	23	0.37				
	4	74	0.19	20	0.09				
4229E1	5	73	1.13	19	2.35				
	6	73	1.33	17	0.34				
	7	73	0.65	22	0.25				
	8	73	0.34	25	0.16				
	9	73	0.16	22	0.16				
	10	73	0.15	20	0.11				
	11	73	0.28	17	0.23				
	12	73	1.56	15	0.76				
	1	74	1.05	19	0.82				
	2	74	0.65	9	0.48				
	3	74	0.88	23	2.46				
	4	74	1.33	20	0.74				

TRIBUTARY FLOW INFORMATION FOR PENNSYLVANIA 1/27/75

LAKE CODE 4229 LAKE WALLENPAUPACK

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
4229F1	5	73	0.99	19	2.78				
	6	73	1.25	17	0.19				
	7	73	0.45	22	0.12				
	8	73	0.17	25	0.06				
	9	73	0.06	22	0.06				
	10	73	0.06	20	0.04				
	11	73	0.13	17	0.10				
	12	73	1.56	15	0.68				
	1	74	0.91	19	0.74				
	2	74	0.45	9	0.31				
	3	74	0.68	23	2.97				
	4	74	1.27	20	0.54				
4229G1	5	73	0.17	19	0.74				
	6	73	0.24	17	0.02				
	7	73	0.06	22	0.01				
	8	73	0.15	25	0.00				
	9	73	0.00	22	0.00				
	10	73	0.00	20	0.00				
	11	73	0.01	17	0.01				
	12	73	0.34	15	0.10				
	1	74	0.15	19	0.12				
	2	74	0.06	9	0.03				
	3	74	0.10	23	0.76				
	4	74	0.24	20	0.08				
4229H1	5	73	0.31	19	1.19				
	6	73	0.42	17	0.04				
	7	73	0.11	22	0.02				
	8	73	0.03	25	0.01				
	9	73	0.01	22	0.01				
	10	73	0.01	20	0.00				
	11	73	0.02	17	0.02				
	12	73	0.57	15	0.20				
	1	74	0.28	19	0.22				
	2	74	0.12	9	0.07				
	3	74	0.20	23	1.30				
	4	74	0.42	20	0.15				
4229ZZ	5	73	0.42	19	0.34				
	6	73	0.71	17	0.62				
	7	73	3.54	22	2.04				
	8	73	2.44	25	2.15				
	9	73	1.54	22	1.25				
	10	73	2.07	20	5.44				
	11	73	3.06	17	1.76				
	12	73	2.66	15	5.21				
	1	74	3.06	19	0.88				
	2	74	1.59	9	0.68				
	3	74	0.88	23	0.45				
	4	74	0.48	20	0.42				

APPENDIX D

PHYSICAL and CHEMICAL DATA

STORET RETRIEVAL DATE 75/01/27

422901
41 27 12.0 075 11 15.0
LAKE WALLENPAUPACK
42127 PENNSYLVANIA

11EPALES
3

2111202
0044 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
73/04/12	13 45	0000	6.9		60	65	8.70	14	0.030	0.300	0.200	0.006
	13 45	0006	6.8	12.0		65	8.80	14	0.030	0.200	0.210	0.016
	13 45	0015	6.8	12.0		65	8.80	15	0.030	0.200	0.200	0.007
	13 45	0025	6.7	12.0		65	8.80	14	0.030	0.200	0.200	0.005
	13 45	0035	6.7	11.9		65	8.70	15	0.030	0.300	0.210	0.006
	13 45	0049	6.7	11.9		65	8.70	12	0.050	0.200	0.220	0.008
73/07/23	11 10	0000	25.0		180	53	6.80	13	0.060	0.300	0.050	0.006
	11 10	0005	24.7	8.2		54	6.60	15	0.060	0.300	0.050	0.005
	11 10	0015	22.7	7.2		52	6.30	15	0.030	0.300	0.050	0.005
	11 10	0025	18.3	3.6		47	5.90	16	0.130	0.400	0.160	0.010
	11 10	0040	11.1	0.9		46	5.90	21	0.270	0.500	0.160	0.019
73/10/03	12 50	0000	18.3	9.0	124	48	6.90	15	0.080	0.800	0.030	0.008
	12 50	0012	18.0	9.4		49	6.80	14	0.040	0.600	0.020	0.005
	12 50	0025	17.6	6.4		48	6.50	14	0.100	0.500	0.020	0.004
	12 50	0035	12.4	0.0		64	6.40	22	0.770	1.200	0.020	0.112
	12 50	0045	10.8	0.0		68	6.50	25	1.370	2.000	0.040	0.174

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L
73/04/12	13 45	0000	0.012	8.5
	13 45	0006	0.014	
	13 45	0015	0.012	
	13 45	0025	0.011	
	13 45	0035	0.012	
	13 45	0049	0.014	
73/07/23	11 10	0000	0.010	6.4
	11 10	0005	0.011	
	11 10	0015	0.013	
	11 10	0025	0.016	
	11 10	0040	0.037	
73/10/03	12 50	0000	0.024	11.6
	12 50	0012	0.019	
	12 50	0025	0.020	
	12 50	0035	0.140	
	12 50	0045	0.330	

STORET RETRIEVAL DATE 75/01/27

422902
41 25 40.0 075 12 45.0
LAKE WALLENPAUPACK
42127 PENNSYLVANIA

11EPALES
3

2111202
0041 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
73/04/12	14	15 0000	6.8		60	65	8.70	15	0.050	0.300	0.250	0.008
	14	15 0006	6.8	12.0		65	8.80	15	0.030	0.300	0.220	0.006
	14	15 0015	6.8	12.0		68	8.70	15	0.030	0.200	0.220	0.005
	14	15 0025	6.7	11.9		65	8.70	15	0.030	0.200	0.220	0.005
	14	15 0038	6.7	11.9		65	8.70	14	0.030	0.200	0.230	0.006
73/07/23	11	45 0000	25.2		180	54	6.80	17	0.070	0.400	0.060	0.006
	11	45 0015	23.4	7.8		53	6.50	17	0.060	0.400	0.070	0.006
	11	45 0025	18.2	3.8		46	5.90	17	0.160	0.400	0.180	0.005
	11	45 0037	11.3	0.9		48	6.10	24	0.310	0.800	0.100	0.012
73/10/03	13	25 0000	17.9	8.6	85	49	7.00	15	0.060	0.800	0.020	0.014
	13	25 0010	17.6	8.0		49	6.80	16	0.070	0.600	0.020	0.005
	13	25 0020	17.5	7.0		48	6.60	17	0.080	0.600	0.020	0.005
	13	25 0030	17.1	2.8		53	6.30	22	0.300	0.800	0.020	0.006

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L
73/04/12	14	15 0000	0.015	9.1
	14	15 0006	0.012	
	14	15 0015	0.010	
	14	15 0025	0.011	
	14	15 0038	0.013	
73/07/23	11	45 0000	0.011	6.0
	11	45 0015	0.014	
	11	45 0025	0.013	
	11	45 0037	0.053	
73/10/03	13	25 0000	0.025	10.1
	13	25 0010	0.018	
	13	25 0020	0.017	
	13	25 0030	0.040	

STORET RETRIEVAL DATE 75/01/27

422903
41 24 07.0 075 15 10.0
LAKE WALLENPAUPACK
42127 PENNSYLVANIA

11EPALES
3

2111202
0037 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
73/04/12	15 00	0000	7.5		60	68	8.90	10K	0.030	0.400	0.250	0.006
	15 00	0006	7.4	11.4		68	8.80	10K	0.030	0.300	0.250	0.006
	15 00	0015	7.4	11.4		68	8.80	10K	0.030	0.200	0.260	0.007
	15 00	0025	7.4	11.4		68	8.80	10K	0.030	0.200	0.250	0.005
	15 00	0037	7.2	11.6		68	8.60	16	0.030	0.300	0.260	0.005
73/07/23	13 40	0000	24.9		192	48	6.80	18	0.060	0.400	0.050	0.007
	13 40	0015	23.4	8.2		48	6.70	17	0.080	0.200	0.080	0.007
	13 40	0025	17.0	2.7		42	6.00	18	0.200	0.300	0.200	0.007
	13 40	0033	12.7	1.0		44	6.00	25	0.270	0.600	0.120	0.014
73/10/03	13 55	0000	18.1	8.6	72	50	6.50	21	0.080	0.900	0.040	0.008
	13 55	0010	17.7	8.2		50	6.50	20	0.070	0.700	0.020	0.004
	13 55	0020	17.6	7.8		50	6.40	20	0.070	0.600	0.020	0.002
	13 55	0028	16.3	1.4		66	6.30	29	0.460	1.100	0.020	0.005

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L
73/04/12	15 00	0000	0.013	6.5
	15 00	0006	0.013	
	15 00	0015	0.013	
	15 00	0025	0.012	
	15 00	0037	0.010	
73/07/23	13 40	0000	0.012	9.1
	13 40	0015	0.014	
	13 40	0025	0.015	
	13 40	0033	0.023	
73/10/03	13 55	0000	0.025	14.9
	13 55	0010	0.021	
	13 55	0020	0.021	
	13 55	0028	0.048	

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 75/01/27

422904
41 22 20.0 075 16 32.0
LAKE WALLENPAUPACK
42127 PENNSYLVANIA

11EPALES
3

2111202
0031 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
73/04/12	15 30	0000	7.7		54	70	8.20	10K	0.030	0.300	0.260	0.006
	15 30	0006	7.7	11.1		65	8.90	10K	0.030	0.300	0.250	0.010
	15 30	0015	7.7	11.1		65	8.90	10K	0.030	0.200	0.250	0.005
	15 30	0022	7.7	11.2		65	8.80	10K	0.020	0.400	0.250	0.006
	15 30	0030	7.7	11.2		65	8.80	10K	0.020	0.400	0.250	0.009
73/07/23	14 10	0000	25.2		132	50	6.90	19	0.050	0.300	0.050	0.007
	14 10	0005	24.6	8.9		50	7.00	19	0.050	0.300	0.040	0.004
	14 10	0015	23.2	8.4		49	6.60	20	0.030	0.400	0.030	0.006
	14 10	0027	15.5	1.9		47	6.10	26	0.220	0.500	0.160	0.007
73/10/03	14 20	0000	18.1	8.6	66	52	6.70	23	0.070	1.000	0.030	0.004
	14 20	0015	17.4	7.0		53	6.50	21	0.100	0.900	0.040	0.005
	14 20	0025	16.2	2.4		83	6.50	25	0.830	1.400	0.030	0.017

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L
73/04/12	15 30	0000	0.017	4.6
	15 30	0006	0.015	
	15 30	0015	0.017	
	15 30	0022	0.017	
	15 30	0030	0.016	
73/07/23	14 10	0000	0.012	13.9
	14 10	0005	0.014	
	14 10	0015	0.019	
	14 10	0027	0.024	
73/10/03	14 20	0000	0.022	14.7
	14 20	0015	0.016	
	14 20	0025	0.042	

K VALUE KNOWN TO BE
LESS THAN INDICATED

APPENDIX E

TRIBUTARY and WASTEWATER TREATMENT PLANT DATA

STORET RETRIEVAL DATE 75/02/03

4229A1
41 27 40.0 075 10 55.0
WALLENPAUPACK CREEK
42089 7.5 HAWLEY
O/LAKE WALLENPAUPACK
US HWY 6 BRDG .5 MI N OF WILSONVILLE
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/06/16	10 10		0.088	1.900	0.066	0.005K	0.015
73/07/22	16 15		0.011	0.280	0.154	0.009	0.010
73/08/27	10 20		0.010K	0.370	0.020	0.008	0.015
73/09/21	15 00		0.012	0.710	0.052	0.005K	0.015
73/10/22	15 35		0.017	0.600	0.063	0.023	
73/11/30	12 00		0.076	0.600	0.032	0.008	
73/12/26	11 00		0.124	1.200	0.036	0.016	0.030
74/01/21	16 30		0.168	0.200	0.024	0.012	0.012
74/03/12	16 00		0.208	0.500	0.035	0.010	0.035
74/03/23	13 30		0.224	0.400	0.020	0.010	0.025
74/04/23	09 30		0.152	0.300	0.010	0.010	0.025

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 75/02/03

4229A2
41 22 02.0 075 19 14.0
WALLENPAUPACK CREEK
42 7.5 NEWFOUNDLAND
I/LAKE WALLENPAUPACK
AT BANK .3 MI E OF LEDGEDALE
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/05/19	15 55		0.126	1.050	0.030	0.005K	0.020
73/06/17	11 15		0.160	0.780	0.044	0.006	0.027
73/07/22	15 01		0.019	0.370	0.189	0.009	0.025
73/08/25	14 04		0.022	4.000	0.126	0.010	0.040
73/09/22	10 30		0.012	0.660	0.019	0.006	0.025
73/10/20	14 20		0.056	0.675	0.054	0.005K	0.036
73/11/30	10 30		0.240	1.300	0.156	0.005K	
73/12/23	14 20		0.336	0.800	0.040	0.008	0.025
74/01/20	15 35		0.368	0.900	0.040	0.008	0.010
74/03/12	16 55		0.310	0.200	0.020	0.005	0.020
74/03/23	11 30		0.312	0.400	0.030	0.005	0.020
74/04/23	09 00		0.168	0.300	0.010	0.005K	0.025

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 75/02/03

4229B1
41 23 14.0 075 14 25.0
MILL BROOK
42 7.5 HAWLEY
T/LAKE WALLENPAUPACK
PA HWY 507 BRDG .5 MI NW MT BAY AIRSTRIP
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/05/19	17 25		0.020	0.140	0.005K	0.006	0.010
73/06/17	10 40		0.084	0.770	0.015	0.014	0.025
73/07/22	14 10		0.040	0.340	0.176	0.017	0.020
73/08/25	14 25		0.090	2.900	0.150	0.018	0.030
73/09/22	09 40		0.075	1.320	0.115	0.013	0.020
73/10/20	16 20		0.010K	0.200	0.018	0.009	0.030
73/11/30	10 00		0.040	0.700	0.028	0.012	
73/12/23	15 10		0.064	0.600	0.032	0.008	0.020
74/01/20	15 10		0.084	0.100K	0.016	0.008	0.010
74/03/10	13 35		0.061	0.600	0.031	0.007	0.015
74/03/23	13 15		0.044	0.500	0.030	0.005	0.020
74/04/21	10 20		0.048	0.100	0.005	0.005	0.015

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 75/02/03

4229C1
41 21 30.0 075 16 15.0
KLEINHANS CREEK
42 7.5 NEWFOUNDLAND
T/LAKE WALLENPAUPACK
PA HWY 507 BRDG 1.5 MI E OF PALMYRA
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/05/19	17 15		0.115	1.890	0.044	0.005K	0.020
73/06/17	10 50		0.099	3.300	0.120	0.008	0.020
73/07/22	14 20		0.063	0.300	0.160	0.015	0.025
73/08/25	14 35		0.075	0.210	0.037	0.014	0.015
73/09/22	10 15		0.115	1.200	0.054	0.009	0.015
73/10/20	16 10		0.015	0.950	0.019	0.005K	0.010
73/11/30	09 30		0.232	1.400	0.028	0.012	
73/12/23	15 05		0.176	0.500	0.020	0.008	0.045
74/01/20	15 20		0.176	0.100K	0.016	0.005K	0.010
74/03/10	13 45		0.160	0.500	0.030	0.005K	0.025
74/03/23	13 10		0.200	1.100	0.108	0.005	0.012
74/04/21	10 40		0.124	0.400	0.020	0.005	0.020

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 75/02/03

422901
41 22 15.0 075 15 10.0
UNNAMED CREEK
42 7.5 NEWFOUNDLAND
T/LAKE WALLENPAUPACK
PA HWY 507 BRDG IN PALMYRA
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/05/14	17 05		0.240	0.320	0.005K	0.005K	0.015
73/06/17	11 15		0.390	0.540	0.013	0.015	0.025
73/07/22	14 25		0.200	0.500	0.075	0.026	0.030
73/08/25	14 48		0.540	0.165	0.013	0.012	0.015
73/09/22	10 30		0.680	1.400	0.048	0.010	0.015
73/10/20	16 00		0.357	0.550	0.009	0.005K	0.035
73/11/30	09 00		0.850	1.200	0.028	0.008	
73/12/23	14 55		0.540	0.800	0.032	0.008	0.025
74/01/20	15 30		0.560	0.100	0.016	0.005K	0.015
74/03/10	13 55		0.620	0.700	0.025	0.010	0.055
74/03/23	12 50		0.590	0.500	0.030	0.005	0.015
74/04/21	10 35		0.384	0.250	0.010	0.005K	0.010

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 75/02/03

4229E1
41 22 55.0 075 19 15.0
ARIEL CREEK
42 7.5 LAKEVILLE
T/LAKE WALLENPAUPACK
RD 63008 BRDG 1 MI NE OF LEDGEDALE
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/05/19	15 45		0.048	2.100	0.054	0.009	0.032
73/06/17	10 55		0.138	2.300	0.084	0.013	0.040
73/07/22	14 25		0.180	1.260	0.075	0.029	0.045
73/08/25	13 50		0.154	2.100	0.088	0.014	0.030
73/09/22	10 15		0.200	0.540	0.018	0.007	0.025
73/10/20	15 05		0.013	0.300	0.011	0.005K	0.020
73/11/30	10 00		0.320	0.400	0.016		
73/12/23	14 10		0.300	0.700	0.038	0.008	0.025
74/01/20	15 30		0.340	0.300	0.020	0.005K	0.015
74/03/12	16 45		0.176	0.300	0.025	0.005	0.030
74/03/23	11 20		0.156	0.600	0.025	0.005	0.035
74/04/21	09 00		0.044	0.500	0.010	0.005K	0.030

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 75/02/03

4229F1
41 25 40.0 075 16 10.0
PURDY CREEK
42 7.5 LAKEVILLE
T/LAKE #ALLENPAUPACK
RD 63009 BRDG .8 MI SE OF LAKEVILLE
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/05/19	15 20		0.060	3.150	0.075	0.008	0.035
73/06/17	10 35		0.138	1.650	0.056	0.018	0.040
73/07/22	14 10		0.110	0.500	0.050	0.025	0.035
73/08/25	13 21		0.260	0.270	0.017	0.027	0.035
73/09/22	09 40		0.190	0.560	0.022	0.011	0.035
73/10/20	14 50		0.048	0.900	0.031	0.005K	0.020
73/11/30	09 50		0.192	0.700	0.016	0.008	
73/12/23	14 00		0.200	0.600	0.052	0.008	0.020
74/01/20	15 20		0.208	0.300	0.044	0.005K	0.015
74/03/12	16 35		0.160	0.300	0.025	0.005	0.025
74/03/23	10 10		0.160	0.600	0.035	0.010	0.035
74/04/21	10 30		0.040	0.300	0.010	0.005	0.025

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 75/02/03

422961
41 25 38.0 075 15 37.0
UNNAMED CREEK
42 7.5 LAKEVILLE
T/LAKE WALLENPAUPACK
RD 63112 BRDG .8 MI S OF PA HWY 590
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/05/19	15 10		0.025	2.300	0.110	0.040	0.080
73/06/17	10 25		0.210	1.900	0.840	0.600	0.670
73/07/22	13 52		0.084	3.360	1.040	0.470	0.550
73/08/25	13 10		0.350	2.800	7.900	3.100	3.800
73/09/22	09 20		0.063	9.350	4.800	1.700	2.400
73/10/20	14 35		0.189	2.100	0.399	2.800	2.900
73/11/30	09 20		0.104	1.450	0.028	0.088	0.240
73/12/23	13 49		0.224	0.400	0.056	0.024	0.045
74/01/20	15 15		0.288	1.100	0.610	0.460	0.590
74/03/12	16 20		0.264	0.500	0.060	0.100	0.145
74/03/23	10 00		0.232	0.400	0.030	0.055	0.105
74/04/21	10 20		0.140	0.600	0.145	0.055	0.055

110

STORET RETRIEVAL DATE 75/02/03

4229M1
41 26 30.0 075 13 28.0
SPINNERBROOK
42 7.5 HAWLEY
T/LAKE WALLENPAUPACK
RD 63112 BRDG .8 MI SE OF JCT HWY 590
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/05/19	14 45		0.021	1.900	0.041	0.007	0.020
73/06/17	10 10		0.115	0.980	0.028	0.022	0.035
73/07/22	13 39		0.260	0.265	0.034	0.010	0.027
73/08/25	12 55		0.336	1.540	0.110	0.027	
73/09/22	09 00		0.094	2.200	0.189	0.020	0.025
73/10/20	14 20		0.010K	0.200	0.042	0.012	0.020
73/11/30	09 00		0.028	0.300	0.012	0.008	0.030
73/12/23	13 32		0.056	0.700	0.024	0.008	0.020
74/01/20	15 00		0.120	0.500	0.068	0.012	0.012
74/03/12	16 10		0.052	0.200	0.025	0.005	0.010
74/03/23	09 45		0.044	2.000	0.060	0.010	0.070
74/04/21	10 00		0.028	0.200	0.010	0.005	0.005

K VALUE KNOWN TO BE
LESS THAN INDICATED

44

STORET RETRIEVAL DATE 75/02/03

4229EA P04229EA P000400
41 26 27.0 075 22 09.0
MIDEOUT PLANT (LAKE ARIEL)
42089 7.5 LAKEVILLE
T/LAKE WALLENPAUPECK
ARIEL CREEK
11EPALES 2141204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
73/07/10	04 30								
CP(T)-			0.290	10.000	3.150		0.480	0.022	0.031
73/07/10	16 30								
73/08/10	04 30								
CP(T)-			0.310	8.200	1.100	0.050	0.135	0.027	0.035
73/08/10	16 30								
73/09/14	11 30								
CP(T)-			0.660	5.100	0.920	0.072	0.120	0.014	0.026
73/09/14	16 30								
73/10/10	16 30								
CP(T)-			0.720	7.900	1.760	0.160	0.200	0.040	0.010
73/10/11	16 30								
73/11/12	04 30								
CP(T)-			0.880	1.100	0.140	0.067	0.610	0.023	0.026
73/11/12	16 30								
73/12/14	04 30								
CP(T)-			1.440	0.500K	0.058	0.150	0.740	0.106	0.053
73/12/14	16 30								
74/02/11	04 30								
CP(T)-			0.720	1.400	0.780	0.040K	0.067	0.057	0.055
74/02/11	16 30								
74/03/11	04 30								
CP(T)-			4.000	1.000K		0.050K	0.120	0.083	0.068
74/03/11	16 30								
74/04/11	04 30								
CP(T)-			0.360	1.000K	0.040		0.190	0.092	0.097
74/04/11	16 30								
74/05/10	04 30								
CP(T)-			1.000	1.200	0.410	0.055	0.085	0.075	0.062
74/05/10	16 30								
74/06/10	04 30								
CP(T)-			0.680	9.000	0.400	0.025	0.210	0.042	0.069
74/06/10	16 30								
74/07/11	04 30								
CP(T)-			0.208	15.000	7.400	3.600	5.500	0.040	0.060
74/07/11	16 30								

K VALUE KNOWN TO BE
LESS THAN INDICATED

42

STORET RETRIEVAL DATE 75/02/03

4229XA AS4229XA P000060
41 09 00.0 075 17 00.0
POCONO PLATEAU CHRISTIAN ASSOCIA
42 7.5 BUCK HILL FA
T/LAKE WALLENPAUPECK
TAYLOR CREEK
11EPALES 2141204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO3&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
73/11/23	14 00		0.050	0.500K	0.197	0.067	0.170	0.001	0.001
74/01/04	15 00		0.960	0.570	0.040K	0.140		0.001	0.001
74/03/01	15 30		0.360	1.000K	0.050K	0.160		0.001	0.001
74/03/17	16 30		0.240	1.000K	0.230	0.077	0.110	0.002	0.002
74/04/18	20 30		0.160	1.000K	0.050K	0.050K	0.050K	0.002	0.002
74/07/01	18 00		0.200	1.000K	0.100	0.090	0.170	0.002	0.002

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 75/02/03

42292A AS42292A P000300
41 25 38.0 075 15 41.0
COVE HAVEN HONEYMOON RESORT
42 7.5 LAKEVILLE
T/LAKE WALLENPAUPECK
UNNAMED STREAM
11EPALES 2141204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
73/07/06	13 00								
CP(T)-			0.076	16.800	5.200	6.060	8.200	0.055	0.055
73/07/06	16 00								
73/08/17	14 30		0.110	31.500	6.900	4.900	23.000	0.061	0.058
73/09/23	13 45		0.440	31.500	24.000	11.600	12.300	0.046	0.048
73/10/17	16 15		0.230	4.700		7.700	8.600	0.035	0.050
73/11/14	11 00								
CP(T)-			0.180	10.500		9.700	11.000	0.034	0.030
73/11/14	16 00								
73/12/19	13 45		17.000	1.000K	0.078	9.400	9.600	0.020	0.024
74/01/30	13 35		0.520	5.800	0.720	6.400	9.500	0.038	0.028
74/02/19	13 15		2.900	10.000	0.580	10.100	11.500	0.034	0.025
74/03/12	13 25		20.000	1.500	0.050	9.700	10.000	0.024	0.026
74/04/14	15 45		10.000	1.700	0.150	11.000	12.000	0.019	0.025
74/05/05	11 00		3.100	1.700	0.210	9.500	9.700	0.029	0.027
74/06/13	14 30		1.400	11.000	3.100	8.250	8.250	0.035	0.032
74/07/20	14 00		9.280	1.000K	0.100	3.150	3.450	0.039	0.039

K VALUE KNOWN TO BE
LESS THAN INDICATED

444

STORET RETRIEVAL DATE 75/02/03

422921 AS422921 P000536
41 27 15.0 075 10 57.0
WALLENPAUPECK AREA HIGH SCHOOL
42127 7.5 HAWLEY
D/LAKE WALLENPAUPECK
LAKE WALLENPAUPECK
11EPALES 2141204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
73/06/19	10 00		1.470	0.990	0.280	0.850	0.890	0.006	0.007
73/07/17	09 00		2.800	2.100	0.360	0.750	0.970	0.002	0.002
73/08/22	12 00		1.820	3.500	0.164	2.720	3.100	0.002	0.003
73/09/20	10 00		4.120	0.500K	0.200	1.700	1.700	0.005	0.006
73/10/19	09 00		18.600	2.500	0.031	1.540	2.700	0.006	0.005
73/11/27	09 30		14.000	0.500K	0.120	4.300	4.400	0.005	0.006
73/12/19	09 30		43.000		1.000	5.900	6.400	0.005	0.006
74/01/25	09 00		42.000	4.000	2.220	9.400	9.400	0.006	0.006
74/02/26	08 30		26.000	5.800	1.000	5.550	6.900	0.006	0.006
74/03/25	12 45		6.600	2.700	0.560	1.950	2.300	0.006	0.006
74/04/23	09 00		18.000	1.800	0.140	3.800	4.100	0.006	0.006
74/05/21	09 30		6.400	1.600	0.050K	3.900	4.400	0.007	0.006

K VALUE KNOWN TO BE
LESS THAN INDICATED

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